

AMENDMENTS TO THE SPECIFICATION:

Please replace the title of the invention beginning on page 1, line 3, with the following rewritten version:

~~THERMALLY EXPANDED MICROSPHERE, PROCESS FOR PRODUCING THE SAME, THERMALLY EXPANDABLE MICROSPHERE AND USE THEREOF~~
HEAT-EXPANDED MICROSPHERES, PRODUCTION PROCESS THEREOF, HEAT-EXPANDABLE MICROSPHERES AND APPLICATION THEREOF

Please replace the paragraph beginning on page 1, line 33, with the following rewritten version:

A process for producing hollow particulates by expanding ~~heat expanding heat-expandable~~ microcapsules, which have been produced by impregnating the same with a blowing agent, in hot gas from an electric hot gas generator has been proposed. (Refer to Patent Literature 3.) As described in comparative example 3 in Patent Literature 3, the process completely failed to produce particulates having preferable properties, when the process was applied to expand heat-expanding microcapsules in which a blowing agent was encapsulated, because the process could not control the retention time of each heat-expandable microsphere in the device, and the resultant hollow particulates had low expansion coefficients and shrunk.

Please replace the paragraph beginning on page 5, line 17, with the following rewritten version:

(6) Heat-expanded microspheres that are capable of re-expanding and produced by controlling the expansion of heat-expandable microspheres, can be filled in a tire-and-rim assembly for running a damaged tire ~~whose internal pressure decreased in which internal pressure has decreased~~ similar to heat-expanded microspheres produced by expanding heat-expandable microspheres almost completely in the specific process. It is preferable for the heat-expanded microspheres that are capable of re-expanding, in particular, to have the ability to start re-expanding at a prescribed high temperature. Recently, tires are

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required to run normally even at high temperatures. It is also required that tires have the ability to supply internal pressure by re-expanding immediately after the tire is damaged and its internal pressure has decreased.

Please replace the paragraph beginning on page 5, line 34, with the following rewritten version:

The first production process for heat-expanded microspheres of the present invention comprises the step of feeding a gas fluid containing heat-expandable microspheres through a gas-introducing tube having a dispersion nozzle on its outlet and fixed inside a hot gas flow, and then jetting the gas flow from the dispersion nozzle, wherein each of the heat-expandable microspheres comprises a shell of thermoplastic resin, a blowing agent encapsulated therein having a boiling point not higher than the softening point of the thermoplastic resin, and an average particle size from 1 to 100 μm , and then colliding the gas fluid with a collision plate fixed ~~on the lower portion of the dispersion nozzle on the downstream side of the dispersion nozzle~~ to disperse the heat-expandable microspheres in the hot gas flow, and heating the dispersed heat-expandable microspheres in the hot gas flow at a temperature not lower than their expansion initiating temperature and thus expanding the heat-expandable microspheres.

Please replace the paragraph beginning on page 10, line 20, with the following rewritten version:

[0043] The examples of cross-linking agents, but not limited to these examples, are aromatic divinyl compounds, such as divinyl benzene and divinyl naphthalene; and di(meth)acrylates, such as allyl methacrylate, triacrylformal, triallyl isocyanate, ethylene glycol di(meth)acrylate, diethylene glycol di(meth)acrylate, triethylene glycol di(meth)acrylate, 1,4-butanediol di(meth)acrylate, 1,9-nanonediol di(meth)acrylate, 1,10-decanediol di(meth)acrylate, PEG (200) di(meth)acrylate, PEG (400) di(meth)acrylate, PEG (600) di(meth)acrylate, neopentylglycol di(meth)acrylate, 1,4-butanediol dimethacrylate, 1,6-hexanediol di(meth)acrylate, 1,9-nanonediol di(meth)acrylate, trimethylolpropane trimethacrylate, glycerin dimethacrylate, dimethylol tricyclodecane diacrylate, pentaerythrutol tri(meth)acrylate pentaerythritol tri(meth)acrylate,

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pentaerythritol tetraacrylate, ~~dipentaerythrutol hexaacrylate~~ dipentaerythritol hexaacrylate, neopentylglycol acrylic acid benzoate, trimethylolpropane acrylic acid benzoate, 2-hydorxy-3-acryloyloxypropyl methacrylate, hydroxypivalic acid neopentylglycol diacrylate, ditrimethylolpropane tetraacrylate, and 2-butyl-2-ethyl-1,3-propanediol diacrylate. One or a plurality of those cross-linking agents are applicable.

Please replace the paragraph beginning on page 10, line 37, with the following rewritten version:

[0045] The polymerization initiator is not particularly limited, and known polymerization initiators can be applied. The examples of those polymerization initiators are peroxides, such as t-butyl peroxy isobutyrate, t-butyl peroxy-2-ethyl hexanoate, t-hexyl peroxy-2-ethyl hexanoate, 2,5-dimethyl-2,5-bis(2-ethyl hexanoyl peroxy) hexane, 1,1,3,3-tetramethylbutyl peroxy-2-ethyl hexanoate, t-butyl peroxy pivalate, t-hexyl peroxy pivalate, t-butyl peroxy neodecanoate, t-hexyl peroxy neodecanoate, 1-cyclohexyl-1-methylethyl peroxy neodecanoate, 1,1,3,3-tetramethylbutyl peroxy neodecanoate, cumyl peroxy neodecanoate, di-n-propyl peroxy dicarbonate, diisopropyl peroxy dicarbonate, bis(4-t-butylcyclohexyl) peroxy dicarbonate, di-sec-butyl peroxy dicarbonate, di-2-ethoxyethyl peroxy dicarbonate, di-2-ethylhexyl peroxy dicarbonate, ~~di-3-methoxybutyl peroxy dicarbonate~~ ~~3,5,5 trimethyl hexanoyl peroxide~~ di-3-methoxybutyl peroxy dicarbonate, 3,5,5-trimethyl hexanoyl peroxide, octanoyl peroxide, lauroyl peroxide, stearyl peroxide, succinic acid peroxide, and benzoil peroxide; and azo compounds, such as 2,2'-azobis (4-methoxy-2,4-dimethyl valeronitrile), 2,2'-azobis isobutyronitrile, 2,2'-azobis (2,4-dimethyl valeronitrile), 2,2'-azobis (2-methyl propionate), and 2,2'-azobis (2-methyl butyronitrile). Preferable polymerization initiators are oil-soluble polymerization initiators which are soluble in radically polymerizable monomers.

Please replace the paragraph beginning on page 11, line 21, with the following rewritten version:

[0047] The examples of the dispersion stabilizers in the aqueous suspension are colloidal silica, colloidal calcium carbonate, magnesium hydroxide, calcium phosphate, aluminum

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hydroxide, ferric hydroxide, calcium sulfate, sodium sulfate, calcium oxalate, calcium carbonate, barium carbonate, magnesium carbonate, and alumina sol. The preferable ratio of the dispersion stabilizer in the monomer mixture is 0.1 to 20 weight percent. ~~As a dispersion stabilizing auxiliaries As dispersion-stabilizing auxiliaries,~~ polymer-type such as diethanol amine-aliphatic dicarboxylic acid condensates, gelatine, polyvinyl pyrrolidone, methyl cellulose, polyethylene oxide and polyvinyl alcohol; and emulsifiers including cationic surfactants such as alkyltrimethyl ammonium chloride and dialkyldimethyl ammonium chloride, anionic surfactants such as sodium alkyl sulfate, and amphoteric surfactants such as alkyltrimethyl betaine aminoacetate and alkylhydroxyethyl betaine aminoacetate may be applied. The preferable ratio of the dispersion-stabilizing auxiliary is 0.05 to 2 weight percent of the monomer mixture.

Please replace the paragraph beginning on page 14, line 6, with the following rewritten version:

[0060] A particulate filler is adhered on the outer surface of raw microspheres by mixing raw microspheres and a particulate filler. The mixing process is not particularly limited, and a device equipped with simple tools, such as a vessel and paddle blades is employable. Ordinary powder mixers for shaking or agitating powders are also applicable. The examples of powder mixers are those which can shake and agitate, or agitate powders, such as ribbon-type mixers and vertical screw mixers. Recently, highly efficient multi-functional powder mixers manufactured by combining several agitation devices, such as Super Mixer (manufactured by Kawata MFG Co., Ltd.), High-Speed Mixer (manufactured by Fukae Co., Ltd.) and ~~New Gram Machine (manufactured by Seishin Enterprise Co., Ltd.)~~ New-Gra Machine (manufactured by Seishin Enterprise Co., Ltd.), have become available.

Please replace the paragraph beginning on page 14, line 21, with the following rewritten version:

The first production process for the heat-expanded microspheres of the present invention comprises the step of feeding a gas fluid containing heat-expandable microspheres through a gas-introducing tube having a dispersion nozzle on its outlet and

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fixed inside a hot gas flow, and then jetting the gas flow from the dispersion nozzle (jetting step), wherein each of the heat-expandable microspheres comprises a shell of thermoplastic resin and a blowing agent encapsulated therein and has a boiling point not higher than the softening point of the thermoplastic resin and have an average particle size from 1 to 100 µm, colliding the gas fluid on a collision plate fixed ~~on a lower portion of the dispersion nozzle on a downstream portion of the dispersion nozzle~~ to disperse heat-expandable microspheres in the hot gas flow (dispersing step), and heating the dispersed heat-expandable microspheres in the hot gas flow at a temperature not lower than their expansion initiating temperature and thus expanding the heat-expandable microspheres (expanding step).

Please replace the paragraph beginning on page 14, line 34, with the following rewritten version:

The expanding device comprises a gas-introducing tube (not marked with a number) being equipped with a dispersion nozzle 4 on its outlet and fixed at the center of the device; a collision plate 5 fixed ~~on a lower portion of the dispersion nozzle on a downstream side of the dispersion nozzle~~ 4; a over-heating protection pipe 3 fixed around the gas-introducing tube at a proper distance; and a hot gas nozzle 1 fixed around the over-heating protection pipe 3 at a proper distance. At the expanding device, the gas fluid containing heat-expandable microspheres 6 runs through the gas-introducing tube in the direction shown with the arrow, and the gas flow 7 runs through the space between the gas-introducing tube and over-heating protection pipe 3 in the direction shown with the arrow, ~~to improve the dispersion of heat expandable microspheres for improving the dispersion of heat-expandable microspheres~~ and to protect the gas-introducing tube and the collision plate from excessive heating. Further, the hot gas flow 8 for heating and expanding runs through the space between the over-heating protection pipe 3 and the hot gas nozzle 1 in the direction shown with the arrow. The hot gas flow 8, gas fluid 6, and gas flow 7 do not necessarily flow in the same direction, though they usually flow in the same direction. In the over-heating protection pipe 3, the cooling medium 2 for cooling is made to flow in the direction shown with the arrow.

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Please replace the paragraph beginning on page 20, line 14, with the following rewritten version:

The heat-expanded microspheres produced in the production process of the present invention show satisfactory result when they are filled in tires and evaluated their ~~running performance in high speed driving with normal pressure~~ running performance in driving with normal pressure and in high-speed driving with normal pressure as described below.